

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An absorbent composite comprising a first stratum, a second stratum, a third stratum, a first transition zone intermediate and coextensive with the first and second strata, and a second transition zone intermediate and coextensive with the second and third strata;

the first stratum comprising first fibers

the second stratum comprising second fibers and absorbent material;

the third stratum comprising third fibers;

10 the first transition zone comprising fibers from the first and second strata commingled substantially uniformly across the composite's width and along the composite's length; and

15 the second transition zone comprising fibers from the second and third strata commingled substantially uniformly across the composite's width and along the composite's length.

2. The composite of Claim 1, wherein first fibers are at least one of synthetic fibers, matrix fibers, and resilient fibers.

3. The composite of Claim 1, wherein second fibers are at least one of matrix fibers and resilient fibers.

20 4. The composite of Claim 1, wherein third fibers are at least one of synthetic fibers, matrix fibers, and resilient fibers.

5. The composite of Claim 1, wherein the first fibers comprises synthetic fibers, the second fibers comprise matrix and resilient fibers, and the third fibers comprise synthetic fibers.

25 6. The composite of Claim 1, wherein the first fibers comprises synthetic fibers, the second fibers comprise matrix and resilient fibers, and the third fibers comprise matrix and resilient fibers.

7. The composite of Claim 1, wherein the first fibers comprises matrix and resilient fibers, the second fibers comprise matrix and resilient fibers, and the third fibers comprise matrix and resilient fibers.

8. The composite of Claim 2, wherein the resilient fibers comprise fibers selected from the group consisting of chemically stiffened fibers, anfractuous fibers, chemithermomechanical pulp fibers, prehydrolyzed kraft pulp fibers, synthetic fibers, and mixtures thereof.

9. The composite of Claim 8, wherein the chemically stiffened fibers comprise crosslinked cellulosic fibers.

10. The composite of Claim 2, wherein the synthetic fibers comprise fibers selected from the group consisting of polyolefin, polyester, polyamide, and thermobondable fibers.

11. The composite of Claim 10, wherein the polyester fibers comprise polyethylene terephthalate fibers.

15. 12. The composite of Claim 2, wherein the matrix fibers comprise cellulosic fibers.

13. The composite of Claim 12, wherein the cellulosic fibers comprise fibers selected from the group consisting of wood pulp fibers, cotton linters, cotton fibers, hemp fibers, rayon fibers, cellulose acetate fibers, and mixtures thereof.

20. 14. The composite of Claim 1, wherein one or more strata further comprises a binder.

15. The composite of Claim 14, wherein the binder is selected from the group consisting of thermoplastic fibers, soluble bonding mediums, and wet strength agents.

25. 16. The composite of Claim 14, wherein the binder comprises bicomponent binding fibers.

17. The composite of Claim 14, wherein the binder comprises a wet strength agent.

18. The composite of Claim 17, wherein the binder comprises a polyamide-epichlorohydrin resin.

19. The composite of Claim 1, wherein the absorbent material comprises a superabsorbent polymer.

5 20. The composite of Claim 1, wherein the first stratum has a basis weight in the range from about 20 to about 80 gsm.

21. The composite of Claim 1, wherein the first stratum comprises polyethylene terephthalate fibers and bicomponent binding fibers.

10 22. The composite of Claim 21, wherein the polyethylene terephthalate fibers are present in the stratum in an amount from about 70 to about 90 percent by weight based on the total weight of fibers in the stratum.

23. The composite of Claim 21, wherein the bicomponent binding fibers are present in the stratum in an amount from about 10 to about 30 percent by weight based on the total weight of fibers in the stratum.

15 24. The composite of Claim 1, wherein the first stratum has a basis weight of about 50 gsm and comprises about 80 percent by weight polyethylene terephthalate fibers and about 20 percent by weight bicomponent binding fibers based on the total weight of fibers in the stratum.

20 25. The composite of Claim 1, wherein the first stratum comprises matrix fibers and resilient fibers.

26. The composite of Claim 1, wherein the first stratum comprises wood pulp fibers and crosslinked cellulosic fibers.

25 27. The composite of Claim 26, wherein the wood pulp fibers are present in the stratum in an amount from about 20 to about 80 percent by weight based on the total weight of fibers in the stratum.

28. The composite of Claim 26, wherein the crosslinked cellulosic fibers are present in the stratum in an amount from about 20 to about 80 percent by weight based on the total weight of fibers in the stratum.

29. The composite of Claim 1, wherein the first stratum has a basis weight of about 40 gsm and comprises about 40 percent by weight wood pulp fibers and about 60 percent by weight crosslinked cellulosic fibers based on the total weight of fibers in the stratum.

5 30. The composite of Claim 1, wherein the first stratum has a basis weight of about 40 gsm and comprises about 50 percent by weight wood pulp fibers and about 50 percent by weight crosslinked cellulosic fibers based on the total weight of fibers in the stratum.

10 31. The composite of Claim 1, wherein the first stratum has a basis weight of about 20 gsm and comprises about 50 percent by weight wood pulp fibers and about 50 percent by weight crosslinked cellulosic fibers based on the total weight of fibers in the stratum.

32. The composite of Claim 1, wherein the second stratum comprises matrix fibers and resilient fibers.

15 33. The composite of Claim 1, wherein the second stratum comprises wood pulp fibers and crosslinked cellulosic fibers.

34. The composite of Claim 33, wherein the wood pulp fibers are present in the stratum in an amount from about 30 to about 80 percent by weight based on the total weight of fibers in the stratum.

20 35. The composite of Claim 33, wherein the crosslinked cellulosic fibers are present in the stratum in an amount from about 20 to about 70 percent by weight based on the total weight of fibers in the stratum.

36. The composite of Claim 1, wherein the second stratum comprises about 30 percent by weight wood pulp fibers and about 70 percent by weight crosslinked cellulosic fibers based on the total weight of fibers in the stratum.

25 37. The composite of Claim 1, wherein the second stratum comprises about 40 percent by weight wood pulp fibers and about 60 percent by weight crosslinked cellulosic fibers based on the total weight of fibers in the stratum.

38. The composite of Claim 1, wherein the second stratum comprises about 50 percent by weight wood pulp fibers and about 50 percent by weight crosslinked cellulosic fibers based on the total weight of fibers in the stratum.

5 39. The composite of Claim 1, wherein the second stratum comprises about 70 percent by weight wood pulp fibers and about 30 percent by weight crosslinked cellulosic fibers based on the total weight of fibers in the stratum.

40. The composite of Claim 1, wherein the second stratum comprises about 75 percent by weight wood pulp fibers and about 25 percent by weight crosslinked cellulosic fibers based on the total weight of fibers in the stratum.

10 41. The composite of Claim 1, wherein the second stratum comprises from about 20 to about 80 percent by weight absorbent material based on the total weight of the stratum.

15 42. The composite of Claim 1, wherein the second stratum comprises about 25 percent by weight absorbent material based on the total weight of the stratum.

43. The composite of Claim 1, wherein the second stratum comprises about 30 percent by weight absorbent material based on the total weight of the stratum.

20 44. The composite of Claim 1, wherein the second stratum comprises about 40 percent by weight absorbent material based on the total weight of the stratum.

45. The composite of Claim 1, wherein the second stratum comprises about 45 percent by weight absorbent material based on the total weight of the stratum.

25 46. The composite of Claim 1, wherein the second stratum comprises about 55 percent by weight absorbent material based on the total weight of the stratum.

47. The composite of Claim 1, wherein the second stratum comprises about 60 percent by weight absorbent material based on the total weight of the stratum.

5 48. The composite of Claim 1, wherein the third stratum has a basis weight in the range from about 20 to about 80 gsm.

49. The composite of Claim 1, wherein the third stratum comprises polyethylene terephthalate fibers and bicomponent binding fibers.

10 50. The composite of Claim 49, wherein the polyethylene terephthalate fibers are present in the stratum in an amount from about 70 to about 90 percent by weight based on the total weight of fibers in the stratum.

51. The composite of Claim 49, wherein the bicomponent binding fibers are present in the stratum in an amount from about 10 to about 30 percent by weight based on the total weight of fibers in the stratum.

15 52. The composite of Claim 1, wherein the third stratum has a basis weight of about 20 gsm and comprises about 80 percent by weight polyethylene terephthalate fibers and about 20 percent by weight bicomponent binding fibers based on the total weight of fibers in the stratum.

53. The composite of Claim 1, wherein the third stratum comprises matrix fibers and resilient fibers.

20 54. The composite of Claim 1, wherein the third stratum comprises wood pulp fibers and crosslinked cellulosic fibers.

55. The composite of Claim 54, wherein the wood pulp fibers are present in the stratum in an amount from about 30 to about 80 percent by weight based on the total weight of fibers in the stratum.

25 56. The composite of Claim 54, wherein the crosslinked cellulosic fibers are present in the stratum in an amount from about 20 to about 70 percent by weight based on the total weight of fibers in the stratum.

57. The composite of Claim 1, wherein the third stratum has a basis weight of about 30 gsm and comprises about 50 percent by weight wood pulp fibers and about 50 percent by weight crosslinked cellulosic fibers based on the total weight of fibers in the stratum.

5 58. The composite of Claim 1, wherein the third stratum has a basis weight of about 30 gsm and comprises about 75 percent by weight crosslinked cellulosic fibers and about 25 percent by weight of a refined blend of wood pulp fibers and crosslinked fibers based on the total weight of fibers in the stratum.

6 69 10 59. An absorbent composite comprising a first stratum, a second stratum, a third stratum, a first transition zone intermediate and coextensive with the first and second strata, and a second transition zone intermediate and coextensive with the second and third strata;

7 70 11 the first stratum comprising polyethylene terephthalate fibers and bicomponent binder fibers;

8 81 15 12 the second stratum comprising wood pulp fibers, crosslinked cellulosic fibers, and absorbent material;

9 92 16 13 the third stratum comprising polyethylene terephthalate fibers and bicomponent binder fibers;

10 103 20 14 the first transition zone comprising fibers from the first and second strata commingled substantially uniformly across the composite's width and along the composite's length; and

11 114 25 15 the second transition zone comprising fibers from the second and third strata commingled substantially uniformly across the composite's width and along the composite's length.

12 125 25 60. An absorbent composite comprising a first stratum, a second stratum, a third stratum, a first transition zone intermediate and coextensive with the first and second strata, and a second transition zone intermediate and coextensive with the second and third strata;

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the first stratum comprising polyethylene terephthalate fibers and bicomponent binder fibers;

the second stratum comprising wood pulp fibers, crosslinked cellulosic fibers, and absorbent material;

5 the third stratum comprising wood pulp fibers and crosslinked cellulosic fibers;

the first transition zone comprising fibers from the first and second strata commingled substantially uniformly across the composite's width and along the composite's length; and

10 the second transition zone comprising fibers from the second and third strata commingled substantially uniformly across the composite's width and along the composite's length.

61. An absorbent composite comprising a first stratum, a second stratum, a third stratum, a first transition zone intermediate and coextensive with the first and second strata, and a second transition zone intermediate and coextensive with the second and third strata;

15 the first stratum comprising wood pulp fibers and crosslinked cellulosic fibers;

the second stratum comprising wood pulp fibers, crosslinked cellulosic fibers, and absorbent material;

20 the third stratum comprising wood pulp fibers and crosslinked cellulosic fibers;

the first transition zone comprising fibers from the first and second strata commingled substantially uniformly across the composite's width and along the composite's length; and

25 the second transition zone comprising fibers from the second and third strata commingled substantially uniformly across the composite's width and along the composite's length.

62. An absorbent article comprising the composite of Claim 1.

63. An absorbent article comprising the composite of Claim 5.

64. An absorbent article comprising the composite of Claim 6.

65. An absorbent article comprising the composite of Claim 7.

5 66. An absorbent article comprising the composite of Claim 21.

67. An absorbent article comprising the composite of Claim 25.

68. An absorbent article comprising the composite of Claim 32.

69. An absorbent article comprising the composite of Claim 49.

70. An absorbent article comprising the composite of Claim 54.

10 71. An absorbent article comprising the composite of Claim 59.

72. An absorbent article comprising the composite of Claim 60.

73. An absorbent article comprising the composite of Claim 61.

74. The composite of Claim 1, wherein the composite is folded into a C-shaped configuration.

15 75. The composite of Claim 59, wherein the composite is folded into a C-shaped configuration.

76. The composite of Claim 60, wherein the composite is folded into a C-shaped configuration.

77. The composite of Claim 61, wherein the composite is folded into a C-shaped configuration.

20 78. An absorbent construct, comprising a first composite and a second composite, each composite comprising first, second, and third strata, and each composite having first and second surfaces, wherein each first surface is the outward surface of the first stratum and each second surface is the outward surface of the third

stratum, and wherein the second surface of the first composite is coextensive with at least a portion of the first surface of the second composite,

the first composite comprising a first stratum, a second stratum, a third stratum, a first transition zone intermediate and coextensive with the first and second strata, and a second transition zone intermediate and coextensive with the second and third strata;

5 the first stratum comprising synthetic fibers and a binder;

the second stratum comprising matrix fibers, resilient fibers, and absorbent material;

10 the third stratum comprising matrix fibers and resilient fibers;

the first transition zone comprising fibers from the first and second strata commingled substantially uniformly across the composite's width and along the composite's length; and

15 the second transition zone comprising fibers from the second and third strata commingled substantially uniformly across the composite's width and along the composite's length; and

20 the second composite comprising a first stratum, a second stratum, a third stratum, a first transition zone intermediate and coextensive with the first and second strata, and a second transition zone intermediate and coextensive with the second and third strata;

the first stratum comprising matrix fibers and resilient fibers;

the second stratum comprising matrix fibers, resilient fibers, and absorbent material;

the third stratum comprising matrix fibers and resilient fibers;

25 the first transition zone comprising fibers from the first and second strata commingled substantially uniformly across the composite's width and along the composite's length; and

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the second transition zone comprising fibers from the second and third strata commingled substantially uniformly across the composite's width and along the composite's length.

79. An absorbent construct, comprising a first composite and a second composite, each composite comprising first, second, and third strata, and each composite having first and second surfaces, wherein each first surface is the outward surface of the first stratum and each second surface is the outward surface of the third stratum, and wherein the second surface of the first composite is coextensive with at least a portion of the first surface of the second composite,

5        10        the first composite comprising a first stratum, a second stratum, a third stratum, a first transition zone intermediate and coextensive with the first and second strata, and a second transition zone intermediate and coextensive with the second and third strata;

              the first stratum comprising synthetic fibers and a binder;

15        the second stratum comprising matrix fibers, resilient fibers, and absorbent material;

              the third stratum comprising matrix fibers and resilient fibers;

              the first transition zone comprising fibers from the first and second strata commingled substantially uniformly across the composite's width and along the composite's length; and

20        the second transition zone comprising fibers from the second and third strata commingled substantially uniformly across the composite's width and along the composite's length; and

              the second composite comprising a first stratum, a second stratum, a third stratum, a first transition zone intermediate and coextensive with the first and second strata, and a second transition zone intermediate and coextensive with the second and third strata;

25        the first stratum comprising matrix fibers and resilient fibers;

the second stratum comprising matrix fibers, resilient fibers, and absorbent material;

the third stratum comprising synthetic fibers and binder;

5 the first transition zone comprising fibers from the first and second strata commingled substantially uniformly across the composite's width and along the composite's length; and

the second transition zone comprising fibers from the second and third strata commingled substantially uniformly across the composite's width and along the composite's length.

10 80. A method for forming a fibrous web, comprising the steps of:

(a) forming a first fibrous furnish comprising fibers in an aqueous dispersion medium;

(b) forming a second fibrous furnish comprising fibers in an aqueous dispersion medium;

15 (c) moving a first foraminous element in a first path;

(d) moving a second foraminous element in a second path;

(e) passing the first fibrous furnish into contact with the first foraminous element moving in the first path;

20 (f) passing the second fibrous furnish into contact with the second foraminous element moving in the second path;

(g) passing a third fibrous furnish between the first and second furnishes; and

(h) withdrawing liquid from the first, second, and third fibrous furnishes through the first and second foraminous elements to provide a fibrous web.

25 81. The method of Claim 80, wherein the first fibrous furnish comprises synthetic fibers.

82. The method of Claim 80, wherein the first fibrous furnish comprises bicomponent binder fibers.

30 83. The method of Claim 80, wherein the first fibrous furnish comprises synthetic fibers and bicomponent binder fibers.

84. The method of Claim 80, wherein the second fibrous furnish comprises matrix fibers.

85. The method of Claim 80, wherein the second fibrous furnish comprises resilient fibers.

5 86. The method of Claim 80, wherein the second fibrous furnish comprises matrix fibers, resilient fibers, and absorbent material.

87. The method of Claim 80, wherein the second fibrous furnish further comprises a binder.

10 88. The method of Claim 87, wherein the binder comprises a polyamide-epichlorohydrin resin.

89. The method of Claim 80, wherein the third fibrous furnish comprises synthetic fibers.

90. The method of Claim 80, wherein the third fibrous furnish comprises bicomponent binder fibers.

15 91. The method of Claim 80, wherein the third fibrous furnish comprises synthetic fibers and bicomponent binder fibers.

92. The method of Claim 80, wherein the third fibrous furnish comprises matrix fibers.

20 93. The method of Claim 80, wherein the third fibrous furnish comprises resilient fibers.

94. The method of Claim 80, wherein the third fibrous furnish comprises matrix fibers and resilient fibers.

95. The method of Claim 81, wherein the synthetic fibers comprises polyethylene terephthalate fibers.

25 96. The method of Claim 84, wherein the matrix fibers comprise wood pulp fibers.

97. The method of Claim 85, wherein the resilient fibers comprise crosslinked cellulosic fibers.

98. The method of Claim 80, wherein the first fibrous furnish comprises synthetic fibers and bicomponent binder fibers; the second fibrous furnish comprises matrix fibers, resilient fibers, and absorbent material; and the third fibrous furnish comprises synthetic fibers and bicomponent binder fibers.

99. The method of Claim 80, wherein the first fibrous furnish comprises synthetic fibers and bicomponent binder fibers; the second fibrous furnish comprises matrix fibers, resilient fibers, and absorbent material; and the third fibrous furnish comprises matrix fibers and resilient fibers.

100. The method of Claim 80, wherein the first and second paths are substantially vertical.

101. The method of Claim 80 practiced in a twin-wire former.

102. The method of Claim 80 wherein the twin-wire former is a vertical downflow former.

103. The method of Claim 80, wherein the first fibrous furnish comprises a foam furnish.

104. The method of Claim 80, wherein the second fibrous furnish comprises a foam furnish.

105. The method of Claim 80, wherein the third fibrous furnish comprises a foam furnish.

106. The method of Claim 80, wherein the step of passing a third fibrous furnish between the first and second fibrous furnishes comprises passing the third material between the first and second fibrous furnishes after the first and second fibrous furnishes have contacted the first and second foraminous elements, respectively.

107. The method of Claim 80, further comprising the step of drying the web to provide an absorbent composite.